

November 15, 2019



U.S. Department
of Transportation

East Building, PHH-30
1200 New Jersey Avenue S.E.
Washington, D.C. 20590

**Pipeline and Hazardous
Materials Safety Administration**

DOT-SP 20938

EXPIRATION DATE: 2021-07-31

(FOR RENEWAL, SEE 49 CFR 107.109)

1. GRANTEE: Worldvu Development, LLC
McLean, VA
2. PURPOSE AND LIMITATIONS:
 - a. This special permit authorizes the transportation in commerce of certain non-DOT specification containers (heat pipes) containing anhydrous ammonia for use in specialty cooling applications such as satellites and military aircraft & non-DOT specification aluminum-lined composite-overwrapped pressure vessels containing Xenon. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.
 - b. The safety analyses performed in development of this special permit only considered the hazards and risks associated with transportation in commerce. The safety analyses did not consider the hazards and risks associated with consumer use, use as a component of a transport vehicle or other device, or other uses not associated with transportation in commerce.
 - c. No party status will be granted to this special permit.
 - d. This special permit serves as an "exemption" as defined in 1;3.1.1 of the ICAO TI and as a "Competent Authority Approval" as defined under 49 CFR § 107.1.
 - e. This special permit serves as an exemption to the ICAO Technical Instructions (ICAO TI) for the transportation of UN1005, Ammonia, anhydrous aboard cargo aircraft. For

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international flights, the ICAO TI may require exemption authorization by the States of origin, transit, over flight, and destination of the consignment, as well as the State of the air operator.

3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 172.101 Table Column (9B) in that anhydrous ammonia is forbidden on cargo aircraft; § 173.301(f) in that the non-DOT specification packaging (heat pipes) is not fitted with a pressure relief device; § 173.304a(a)(2) in that non-DOT specification packaging is not authorized for anhydrous ammonia, except as specified herein; and Packing Instruction 200 of the ICAO TI in that non-DOT specification packagings are authorized, and Column (9B) of § 172.101 Hazardous Materials Table and Columns 12 and 13 in Table 3-1 of the ICAO TI is waived in that anhydrous ammonia is forbidden for cargo air transport, and the "Q" value requirements for anhydrous ammonia in 4;1.1.9(e) of the ICAO TI are waived, except as provided herein; § 173.302a(a)(1), § 171.23(a)(1) and (3) in that non-DOT specification cylinder will be used to transport xenon gas.
5. BASIS: This special permit is based on the application of Worldvu Development, LLC dated August 27, 2019, submitted in accordance with § 107.117 and a determination that it is necessary to prevent significant economic loss.
6. HAZARDOUS MATERIALS (49 CFR 172.101):

Hazardous Material Description			
Proper Shipping Name	Hazard Class/ Division	Identification Number	Packing Group
Ammonia, anhydrous	2.2/2.3*	UN1005	N/A
Xenon, compressed	2.2	UN2036	N/A

*Division 2.3 for international transportation. Division 2.2 as an alternate when only domestic transportation is involved.

November 15, 20197. SAFETY CONTROL MEASURES:

a. PACKAGING: Prescribed packagings are non-DOT specification containers which are installed in spacecraft or components of spacecraft and are overpacked in a transport container. The packagings, components, and transport containers must meet design and testing requirements as described in the application on file with the Office of Hazardous Materials Safety Approvals and Permits Division and as follows:

(1) Heat pipes must be constructed of axially grooved tubing (aluminum alloy 6063-T6) with an end cap and fill tube welded to opposing ends, not to exceed one (1) inch in internal diameter and four (4) Liters in volume. Heat pipes must be in accordance with Drawing number F0100033. The heat pipes must have a working pressure of 330 psi at 130°F. The design burst pressure of the heat pipe extrusion must be 2669 psi ($> 2.4 \times \text{MEOP}$). The heat pipes are not equipped with pressure relief devices.

(2) Aluminum-lined, composite-overwrapped pressure vessels in accordance with Doc No 1000206973. Pressure vessels must have a volume of 9L and a maximum working pressure of 2,393psi (165bar). The design burst pressure of the cylinder must be 4786 psi(330bar).

b. TESTING:

(1) For the heat pipes described in paragraph 7a.(1) above, testing is as follows:

(i) Welds must be radiographically inspected per ISO 17636 on Lot Acceptance Test units (minimum 1 unit per heat pipe manufacturing batch with a maximum batch size of 50).

(ii) All of the heat pipes must be pneumatically tested, and embedded heat pipes must be proof pressure tested to more than 1813 psi ($> 1.6 \times \text{MEOP}$), and surface mounted heat pipes must be proof pressure tested to more than 943 psi ($> 3 \times \text{MEOP}$).

(2) For the Xenon tanks described in paragraph 7a.(2) above, testing must be in accordance with ECSS-E-ST-32-02C and ISO 11119-2.

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c. OPERATIONAL CONTROLS:

(1) The amount of anhydrous ammonia in each heat pipe must not exceed 47g. The total amount of heat pipes per satellite is six (6).

(2) The amount of Xenon in the composite pressure vessel must not exceed 14kg. Each satellite is equipped with one Xenon pressure vessel.

(3) Emergency response information provided with the shipment and available via an emergency response telephone number must indicate that the heat pipes are not fitted with pressure relief devices and provide appropriate guidance in case receptacles are exposed to fire.

d. MARKING: The outer transport container must be plainly and durably marked on two opposite sides in characters at least 2 inches high on a contrasting background "DOT-SP 20938".

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this special permit for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this special permit.

b. A person who is not a holder of this special permit, but receives a packaging covered by this special permit, may reoffer it for transportation provided no modification or change is made to the packaging and it is offered for transportation in conformance with this special permit and the HMR.

c. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.

d. Each packaging manufactured under the authority of this special permit must be either (1) marked with the name of the manufacturer and location (city and state) of the facility at which it is manufactured or (2) marked with a registration symbol designated by the Office of Hazardous Materials Special Permits and Approvals for a specific manufacturing facility.

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- e. A current copy of this special permit must be maintained at each facility where the packaging is manufactured under this special permit. It must be made available to a DOT representative upon request.
9. MODES OF TRANSPORTATION AUTHORIZED: Cargo aircraft, motor vehicle, cargo vessel.
10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each cargo vessel, aircraft or motor vehicle used to transport packages covered by this special permit. The shipper must furnish a copy of this special permit to the air carrier before or at the time the shipment is tendered.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:
- o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
 - o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
 - o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—"The Hazardous Materials Safety and Security Reauthorization Act of 2005" (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term

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"exemption" to "special permit" and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous materials incident reports. In addition, the grantee(s) of this special permit must notify the Associate Administrator for Hazardous Materials Safety, in writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:



for William Schoonover
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, East Building PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: Kenny Herzog/AS